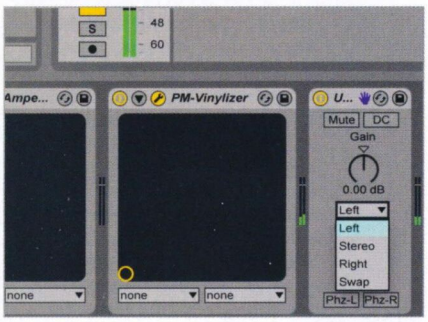
> Step by step 1. Getting an SP-1200-style sound in software

1 > For vintage sampling vibes, we must first make our loop sound as if its been recorded on tape and pressed to vinyl. Load **1. Funk Groove Dry.wav** into your DAW and use filters to cut below **40-70Hz** and above **12-15kHz** (removing more frequencies for 60s vibes, less for 70s). We add a tape sim - the UAD Ampex ATR-102, but any will work - and drive the input quite hot (about **7dB**).

2 > The tape sim is enough to add saturation and cohesion without ruining the dynamic range. Next, we introduce some simulated vinyl noise. We're using Plug & Mix's Vinylizer for a little 'crackle' and 'pop' ('snap' is optional). Judge the amount of these on the target age of your loop (again, more for 60s-style, less for 70s) but also on the style of track you're making.



3 > Next, we need to make the signal mono. Most classic sample tracks simply took the left or right channel (we've chosen Left here, as it has a nicer sound). If you really can't live with a totally mono loop, we recommend summing it to mono anyway, then adding width using artificial stereo plugins or reverb.

4 > Finally, we recreate the effect of sampling via a sampler's audio inputs. Signals were usually recorded quite hot, so you might add some gentle compression to simulate overdrive before applying your bitcrusher. We're after an SP-1200 vibe, so we use D16 Group Decimort's SP-1200 preset and apply input gain to capture that hot sound.

Toolbox tips

If you want a truly authentic vintage sampled sound, you'll first need vintage emulation plugins to recreate the recording characteristics of the era. A tape emulator is great for saturation - UAD's Studer A800 and Ampex ATR-102 emulations are exquisite, as are Waves' Kramer Master Tape and Slate Digital's Virtual Tape Machines; but for tighter budgets, you could try SKnote's tasty Roundtone.

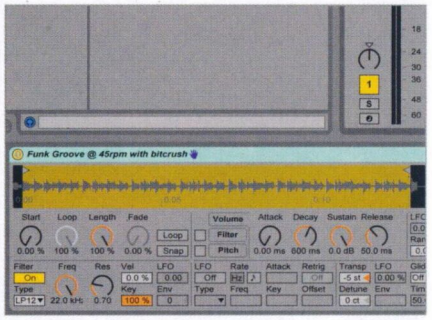
Next comes a bit reduction effect, for which you won't find much better than D16's Decimort, with its MPC60, EPS, FZ-1, Emulator and SP-1200 presets, and more. FabFilter's Saturn is another good option (this also does a good tape emulation), and Togu Audio Line's TAL-Bitcrusher, though not supported any more, is available as a free download.

Alternatively, for a one-stop solution, AudioThing's Vinyl Strip offers a selection of vinyl-emulating distressing effects plus sampler-style bitcrushing.

Owners of NI's Maschine might want to bypass these steps altogether and simply plump for its built-in MPC60 or SP-1200 sonic modes. Akai's MPC Renaissance also offers vintage models of the MPC60, MPC3000, SP-1200 and other classics.

AudioThing's Vinyl Strip lets you dial in the sound of effects, vinyl and samplers

> Step by step 2. Mimicking SP-1200-style sampling technique



1 > To make the most of their samplers' tiny memory, hip-hop producers recorded their 33rpm records in at 45rpm, then slowed the sample down in the sampler, further colouring the sound. To simulate this, load **1. Funk Groove for SP 1200.wav** into a sampler, and simply play it five semitones up.

2 > We've left a little bit of music at each end. Another key aspect of the SP-1200 was its rough start/end point selection - its maximum editing resolution was 25 samples. Apply Decimort's SP-1200 preset to reduce the bitrate, then render the loop. We then put this sample back into a sampler and play it five semitones down, just as those hip-hop samplists did.

3 > We set our start point by ear with the waveform zoomed out for authentically coarse looping, and draw in two four-bar MIDI notes to re-trigger the sample. To change the tempo, simply raise or lower the playback pitch and adjust the tempo to fit the loop length in 0.1bpm increments (that's all the SP-1200 offered)!

10 old-school sampling tips

01 TIME TO PITCH

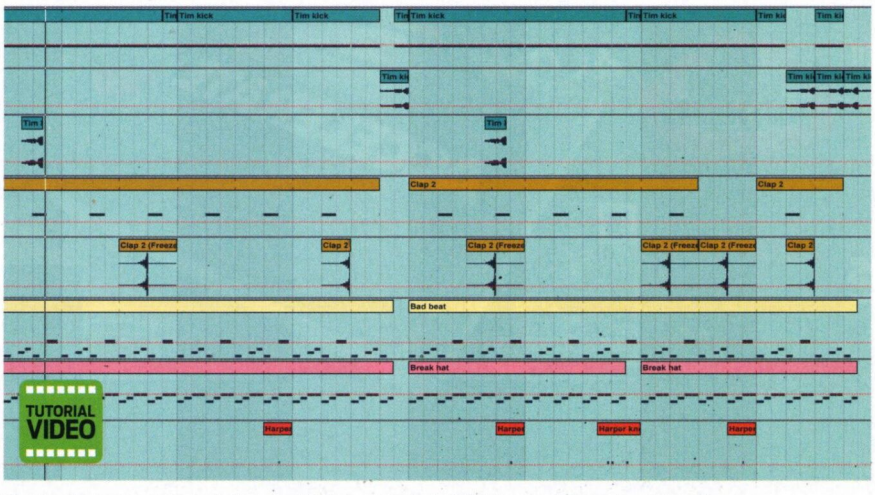
Although basic timestretching was a feature on early samplers, it didn't always give the desired results. To fit a sample's timing to a track, producers would simply play it at a lower or higher note, to speed it up or slow it down. Of course, this would affect the pitch of the sample, too – hence all the high-pitched chipmunk vocals in early hardcore and jungle music. Often, though, it can sound even better and punchier than the best modern warping, particularly on drum loops, as it preserves transients perfectly. Try getting your drum loops in time by tuning them up or down (using a re-pitch mode) first, then render them at that speed before editing them further.

02 GATED TRIGGER

New genres go hand in hand with new technology, and the early-to-mid-90s brought us both jungle (the forerunner to DnB) and affordable timestretching. Not only was it suddenly possible to take a vocal and add it to a track at a very different tempo without making it sound like a chipmunk on helium (or the devil talking slowly), but producers also realised that by halving the tempo, then halving it again (and so on!), they could create slowed-down versions of words and phrases. The process duplicates slices of the sample, creating a gated, stuttering sound – an almost sonic-strobe-like effect – and it still sounds great today!

03 FLIP REVERSE IT

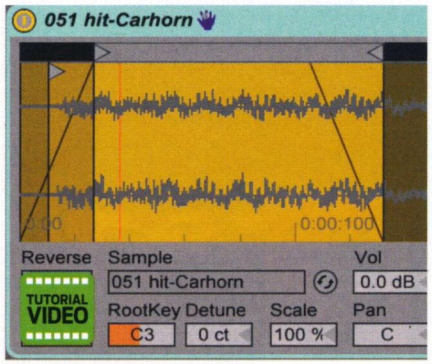
For almost as long as people have been sampling sounds, they've been reversing them. Reserve sounds can be great for edits, and can even form an integral part of your rhythm. Reversed percussion hits like drums and claps can feed into the unreversed hit, or even just sit within the rhythm to give a pump to the groove. It's generally best to place them so that the end of the reversed sound lines up with a beat, even if there's no other hit falling at the same time. If a reversed sound doesn't end on a beat, try adding another bit of percussion at that point to maintain the groove.



We can all reverse a sample, but here we'll show you how to fit it into an existing groove or track

04 SP BASS

Vintage samplers were nothing if not quirky, so it's worth reading up on the unique idiosyncrasies of the kit behind your favourite classic tracks. For example, early-90s New York hip-hop was awash with grimy, low-passed basslines, in part thanks to an oddity of the SP-1200, as Public Enemy producer Hank Shocklee explained to *The Village Voice* (Read the full article at **bit.ly/HankVVoice**). "One day I was playing *Black Steel in the Hour of Chaos*, and it came out real muffled. I couldn't hear any of the high-end part of it. I found out that if you put the phono or quarter-inch jack halfway in, it filters the high frequency. Now I just got the bass part of the sample. I was like, 'Oh, shit, this is the craziest thing on the planet!'" To recreate this, simply add a low-pass filter before your bitcrusher!



In this video, we'll show you how to artificially impose the limits of early sampling technology upon yourself

05 CREATIVE LIMITS

Early digital consumer technologies had memory limitations that we'd consider laughable now. Back then, sampling time came at a premium that we're not used to today, but this led to some pretty inventive behaviour, which in turn resulted in some unique sounds.

Memory could be saved in many places. In order to achieve sustain, for example, it was necessary to use just a short looped section of the sample. When you pressed a key, the attack phase would be played until it reached this looped section, which then continued to play until the key was released, at which point the sample would play from the looped section to the end.

This looping effect was often imperfect and – more importantly – noticeable, and became a key part of the character behind many early sample-based riffs, such as the ubiquitous car horn noise popularised by Todd Terry. This memory limitation, in conjunction with low-resolution editing, meant that the sound of the short loop could be hard to conceal, but one way to deal with this is to throw caution to the wind and use the effect as an overt characteristic that adds to the vibe of the track.

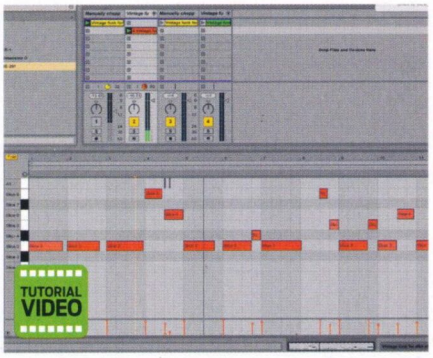
06 SINE OF THE TIMES

Akai's early S900 and S950 samplers were famously prodigious synth bass monsters. Switching on either machine yielded a default sample of a simple sine wave bass, synonymous with early hip-hop, hardcore, jungle and DnB. Sine wave bass is notoriously hard to make interesting, but a combination of 12-bit circuitry and less-than-transparent analogue outputs added real oomph. Recreate this by running a sine wave riff through a bitcrusher and some analogue saturation plugins. The difference may seem subtle until you throw it into a track with other elements.

We use the UAD Ampex ATR-102 to add grit to a simple sine-wave bassline

07 COMBINED METHODS

Some early sample-based machines – such as Roland's D-50 – combined synthesis and sampling. This was partly for creative reasons, but also partly to overcome the limited sampling time available. This technique can produce layered sounds such as percussive strikes and attack phases (that need not change pitch when they're played up and down the keyboard) over sustained sounds that can be played musically. Try your own combinations by mapping two different sounds to the same key-range in your sampler and adjusting their respective envelopes. For example, the attack portion of a piano with the sustain of a trumpet sample. Or a kick sample and an electronic organ, Daniel Beddingfield-style.



Want to know exactly how to slice and play back drum loops the old-fashioned way? We've got you covered

08 CUT THE CHORD

A classic sample-riff effect is to sample a chord and play a riff as if using a regular synth patch. Two things happen in this case: the length of the sample changes (higher notes are shorter, while lower notes get longer), which can have a dynamic effect on the groove; and the actual sound can be rather unusual, as real players don't usually play riffs by transposing all the notes of a given chord up and down in identical semitone intervals. Recreate the effect by recording a chord playing your favourite synth patch, load that recording into a sampler and get busy creating a short riff.

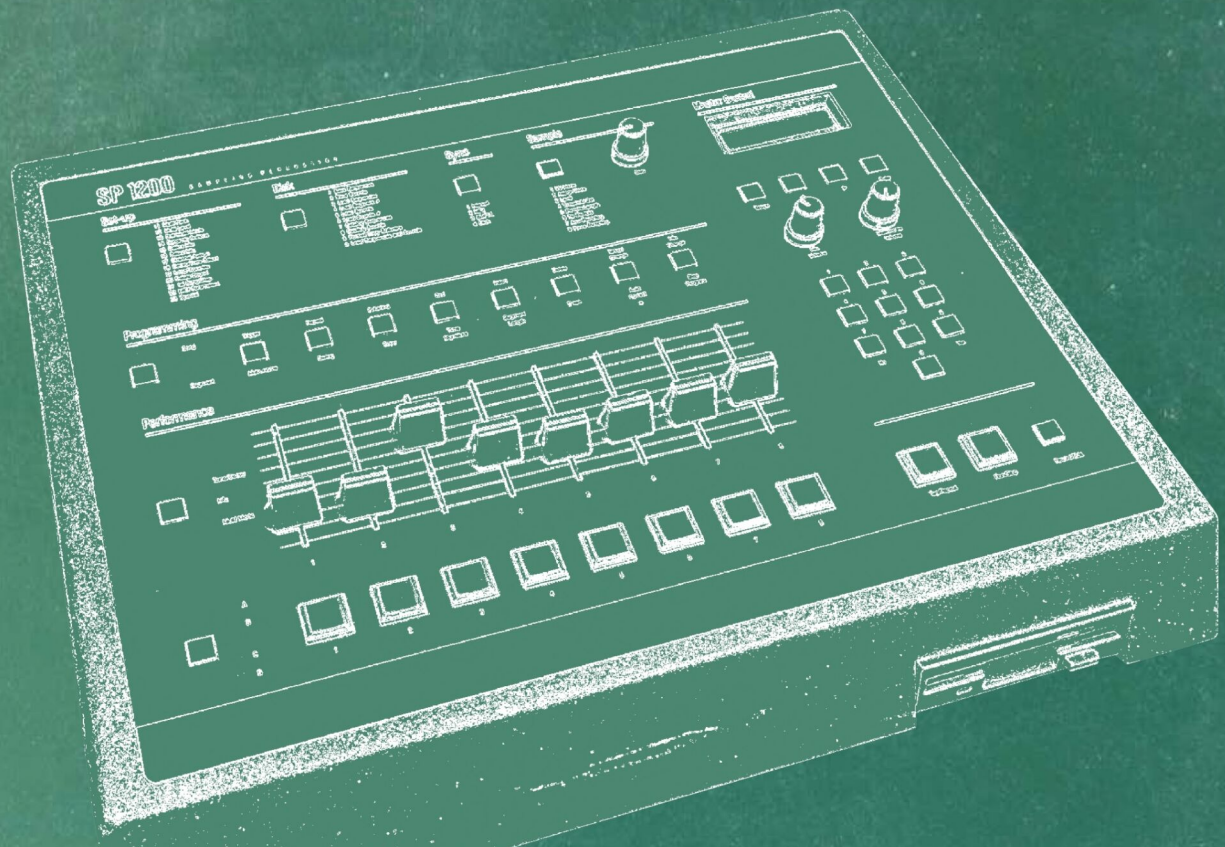
09 VOCAL TRICKS

The mid 80s saw a new kind of vocal taking the charts by storm: the sampled vocal riff. Whether your first introduction was Whistle's *Just Buggin'*, (**bit.ly/JustBuggin**) or Stock Aitken and Waterman's production of Mel & Kim's *Respectable* (**bit.ly/MKrespectable**), nobody could avoid that distinctive sound. By the mid 90s, it was all but dead and buried – a cheesy anachronism born of naïvety and new technology... until a couple of years ago when Major Lazer made a career out of it, starting with *Pon De Floor* (**bit.ly/MLPonDeFloor**) – subsequently sampled for Beyonce's *Run the World (Girls)* – and continuing right up to the recent hit collaboration with DJ Snake and MØ, *Lean On*. The modern Major's general approach employs heavy pitch modulation, but it's essentially the same simple trick: take a word or syllable from a vocal, map it across the keyboard and play a riff or accompaniment.

10 SLICE IT AND DICE IT

A defining innovation of early jungle sampling was the slicing and re-ordering of drum loops, achieved by slicing a beat into chunks and triggering each one in succession via MIDI. Tracks like DJ Seduction's *Sub Dub* (**bit.ly/SeductionSubDub**) created a blueprint for the DnB that was to come by varying the playback pattern in each bar constantly over 8, 16 and even 24 bars.

This was achieved in different ways, the first of which was by carefully chopping a one-, two- or four-bar break into parts with different start points for re-triggering from (choice snares, kicks, 'shuffles', fills, etc). Alternatively, it can be done by copying the same break to between five and ten adjacent keys, and setting a different sample start point for each key (again, choosing percussive hits like kicks and snares). Another way to do the same is to simply slice the loop into quantised measures (eighth-notes, quarter-notes, half-notes, whole notes, etc), complete with off-grid glitchy attack phases and some sliced 'air' to open the loop up again. **cm**



OLD-SCHOOL SAMPLING

Get the authentic sound and vibe of early sampling with our guide to recreating classic techniques

> It's hard to believe that in the space of most of our lifetimes, a completely unknown new musical technology has gone from science fiction to utter ubiquity, via novelty and controversy – so much so that even those of us old enough to have experienced a time before digital sampling mostly struggle to remember it. As with most technology that we all take for granted, there's a huge amount of confusion (ie, 'bollocks spoken') about what it is, how it works, and why we love or hate it so much.

The term 'sampling' originally referred to the act of converting real-world analogue waveforms into 'sampled' digital snapshots of sonic moments, which could be stored, manipulated and played back. Nowadays, almost all the music we hear, whether on TV, radio, the internet or CDs is already in digital format; the only exceptions are music on tape or vinyl – and if those tapes or vinyl are playing music recorded in the last 20 years, you can bet they've gone through a digital process at some point. Of course, with modern gear, it's near impossible to distinguish between a high-quality digital sample/recording and the source signal, but it wasn't always this way, with vintage units being noted for their lack of transparency.

Early samplers were used to capture and manipulate real-world sounds. It's crazy to imagine it now, but as recently as the early 80s, most people had never had the opportunity to record a spoken word and re-trigger it in a stuttering fashion, or play a tune with it; and the idea that a group of kids could take a section of their favourite track, play it back in a loop, add lyrics on top and make a hit record was laughable. Back then, some top producers even thought it was evil and inherently unmusical.

One thing is for sure, though: those early samples – whether they were loops from 70s soul records or individual drum hits – all had very distinctive vibes, beyond that of the source material. Imperfections and limitations of the sampling technology of the day, and the inventive workflows created to compensate, added character that still sounds great today. Let's take a look at how to recreate it...

DOWNLOAD

Get the videos and tutorial files on your PC/Mac at **vault.computermusic.co.uk**

Sampling hardware: a slice of history

It's impossible to recreate the sound of old-school sampling without knowing a bit about the technology of the era – in particular, its limitations, which gave rise not only to sonic character, but also hugely influenced the way things were sampled, what was done to them after, and, therefore, the music that came about.

Following the little-known Computer Music Melodian, the first sampler to really make its mark was the mighty Synclavier, costing up to $500,000. Things ramped up further in 1979 with the Fairlight CMI (Computer Musical Instrument). This 8-bit Australian monster cost the same as a nice house and was a game-changer. Spec-wise, it was modest even by the standards of a modern children's toy, but clever programming and exquisitely designed components allowed a surprisingly rich tone.

© Rex Features

E-MU's Emulator II was the first bona fide 'affordable' sampler, proving a hit with acts like the Pet Shop Boys

Early days

Nothing remotely 'affordable' came along until 1984 – the first such device was E-MU's Emulator II. The intervening years had seen a number of drum machines embracing basic sampling technology (Linndrum LN-1, E-MU's own Drumulator and the Oberheim DMX being three classic examples), but the 8-bit Emulator II combined some revolutionary DACs (almost rendering its output at 12-bit quality) with a lush 4-pole 24dB/oct true-analogue low-pass resonant filter. At $8000 (about $18000 in today's money), it wasn't cheap, but it suddenly placed sampling within financial reach of a new generation of bands and studios. This price, combined with the Emulator II's great sound and many third-party libraries, saw it dominate mid-to-late-80s pop and soundtrack music.

1987 saw the release of one of two defining samplers in hip-hop, E-MU's SP-1200. It may have only offered ten seconds of sampling at 12-bit, but it allowed the construction of entire tracks, and so quickly became the first practical, compact 'studio-in-a-box'. The following year heralded the other iconic hip-hop one-stop studio shop, Akai's MPC60. Designed by the legendary Roger Linn, it introduced the 4x4 pad matrix we still love today, and was – in many ways – technically superior to the SP-1200 (cue three decades of arguments about which is the better machine). Both were enjoyed by producers in other genres, of course, but it's with hip-hop that they'll forever be associated.

Classic sounds

Alongside these production workstations, other 8- and 12-bit legends were being forged in the late 80s. Akai's S900 and S950 were filling up studios across the world, and their meaty sounds cut proudly through mixdowns for hip-hop and early house producers alike. On the fledgling house music scene, the growly Casio FZ-1 had stuttered vocals rocking dancefloors from Chicago to Ibiza, while the Ensoniq Mirage, Ensoniq EPS and EPS16+ shifted enough units to later provide cheaper second-hand routes into sampling for up-and-coming producers.

The early 90s was all about keyboard-based sampling workstations, with Roland's W-30 driving every Prodigy track until 1997 (and, reportedly, their stage shows until as late as 2007), while on the other side of the pond, Ensoniq's ASR-10's keen price made it the choice of such hip-hop legends as the Wu-Tang Clan, D'Angelo, Kanye West and, er... Beck.

For those with bigger wallets, the mid 90s brought hitherto undreamt of power. Akai's flagship S3000 became the industry standard, while those with a hankering for more muscle and memory opted for the E-MU EIV series sampler. The legendary Z-plane morphing filters on this beast came to define the sound of DnB breaks, achieving an almost machine-gun-like gated-filter effect that you just couldn't replicate any other way (then or now). Roland also contributed massively to the DnB scene, largely through the almost religious devotion of Roni Size, who began his seminal *New Forms* album on an S550 before adding a much meatier S760.

All of these machines offered something different to the mix, both creatively and sonically – from the Mirage's cheap and gritty convertors to the more musical Emulator II – and it's well worth an afternoon's net surfing to familiarise yourself with the tracks they facilitated. You'll quickly come to recognise the sounds of individual machines at work, making it much easier to recreate the vibes you're after.

A soft touch

If you want to capture the sound of vintage gear, there are no shortage of sample collections available meticulously recorded via many of the classics we've listed here, but they don't allow you to sprinkle your own material with that lo-fi fairy dust. Over the next few pages, we'll look at ways to simulate the sounds of old machines, but for a number of them, you can go straight for a virtual recreation. One such, 112dB's Morgana, is a painstaking recreation of Ensoniq's beloved Mirage, right down to the chips. At times, the recreation can be almost *too* authentic, particularly when editing, although the virtual faders are more than you got with the original hardware unit!

For the sound of an Emulator II, Togu Audio Line offer TAL-Sampler. This also offers an emulation of the classic AM6070 chip associated with many early sampling instruments (such as the Linndrum LM-1 and DMX drum machines), and different DA convertor models to approximate other samplers of the period. It's not a strict recreation, but the sound and architecture offer a fairly authentic experience.

You can still pick up an Akai S950 relatively cheap, if you covet that classic vibe and don't mind the inconvenience

If all this whets your appetite to the point that you want the feel of solid knobs between your fingertips, you could consider trying out the real thing – it might be much cheaper than you think. While classics like the SP-1200 and MPC60 still go for ludicrous money on eBay – make that *astronomically ludicrous money* if you're looking for a Fairlight – some lesser-celebrated but beautifully characterful machines go for around the £100 mark when they crop up. One example is the Akai S950, which offers the 12-bit meatiness of an MPC60 for about a tenth of the price. Another is the E-MU e6400 (an upgradable version of their most powerful sampler, the EIV) which boasts some of the warmest digital filters ever to grace a 19-inch rack.

On a loop: the history of sampling

We've looked at the chronology of hardware sampler technology, but what about the sounds that were actually being sampled? Owing to huge prices, limited editing possibilities and, critically, low sampling time, the early years of sampling were dominated by exotic sample libraries, putting recreations of existing instruments in the hands of composers and mega-studios that could probably afford to get the real thing. The exciting new twist was that they could all be played via keyboard, and manipulated in entirely new ways. In this sense, they were being used as extremely fancy Mellotrons (the 60s tape-based instrument that brought us the opening flute riff on *Strawberry Fields*), but all that was about to change.

Born in The Bronx

As early as 1979, there were signs of where sampling technology might take music. The Sugar Hill Gang's *Rapper's Delight* – released in the same year as the first sampler – is often cited as one of the first sample-based records; but the iconic *Good Times* instrumental was, in fact, replayed by a band. The track did reflect a new musical genre, though: hip-hop. Hip-hop was born in the block parties of The South Bronx and Queensbridge, where MCs would chat over classic funk breaks, manually looped by a DJ using double copies. And perhaps there hip-hop might have stayed, had it not been for the next generation of genuinely affordable samplers.

Most early hip-hop tracks were simple, using basic synths and drum machines. Consequently, there were occasional breakthrough hits, but with no ready access to real instruments, aspiring young hip-hop producers had no way to inject real soul into their backing tracks, and thus the rapping itself couldn't develop musically. It was in this climate that the SP-1200 and MPC60, arrived. Suddenly, producers raised on funk and soul had access to and could harness two decades of musical history.

The effect, on not just hip-hop beats but the rapping they inspired, set the wheels in motion for the global phenomenon we see today (and, as many grateful lawyers will testify, sowed the seeds of musical copyright law as we know it).

And it wasn't just hip-hop that was born of sampling. The nascent jungle scene of the early 90s owed its existence to the fresh availability of affordable samplers, capable of capturing drum breaks and speeding them up. By placing the means to create whole tracks in the hands of young producers in their bedrooms, away from the established studio system, these bits of kit were abused and put to uses their designers never intended. Stories abound of how many hardcore producers that actually had time-stretching capability on their samplers simply didn't know how to work it, so they pitched up vocals to make them quicker, creating two years of high-octane chart rave (and two decades of shame for those who bought it). Likewise, before Propellerhead's ReCycle!, slicing breaks and resequencing them to change the tempo meant hours of work – much easier to just pitch them up! The technology not only made the music possible, it almost gave birth to it.

Sampled legacy

Which brings us to the present day. In many ways, sampling has come full circle – the vast ROMpler instruments and libraries now available for instruments like Kontakt provide near-perfect recreations of whole orchestras, and the vast range of today's prerecorded loops harks back to the earliest drum machines, when preset rhythms were the order of the day. In some ways we have, perhaps, taken a step back.

With this in mind, over the course of the next few pages, we're going to look at some ways to reach back to that exciting and rebellious period in sampling's history, and apply some of its rough and innocent imperfection to our pristine modern productions. We'll start with some walkthroughs showing how to capture the iconic 12-bit SP-1200 sound and apply it to our own music, then dive into some more general old-school sampling techniques.

The legacy of the E-MU SP-1200, with its 12-bit resolution and ten-second capacity, lives on in early hip-hop tracks

Capturing a classic

Few people know more about capturing the sound of a classic sampler than The Professor, tech-bod-in-chief at sample masters Rhythmic Robot. They recently immortalised one of the most iconic sampler sound banks in history – the Emulator II's Universe of Sounds – as a Kontakt library. Capturing its true sound for a new generation wasn't a simple matter.

"I think the biggest factors are sample depth and the convertors," explains The Professor. "The 'old skool' sound owes a lot to the grainy resolution of early 8-bit and 12-bit machines, which bring a lot of imperfection to the waveform that our ears find curiously attractive. Aliasing noise, for example, sometimes adds a sheen to a sample that makes it sound crisp, while low bit depths seem to make bass tones sound weightier.

"The Emulator II manual expressly suggests recording your sample to tape before sampling it into the EII, so as to be able to set your sample levels precisely; so there's a kind of double-whammy of flavour being added."

Consequently, the Rhythmic Robot team had to be meticulous.

"We resampled the whole library, patch by patch, from the audio outputs of a reconditioned EII. That means the sound of the convertors and the EII's analogue filter is preserved.

"We sampled every single note of every patch chromatically, so that the signature character of the EII's interpolation algorithm was preserved. Original EII patches usually had just a few samples – often four or five – spread over the keyboard, maybe one per octave, and the machine can sound quite growly at the extremes. We were determined to preserve that.

"You have no idea how long it took... and it's only half. We're doing the other half now, in between regretting that we ever started this madness!"

cm readers can get 15% off Rhythmic Robot's Universe of Sounds collection using the coupon code CMDEAL www.rhythmicrobot.com

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10 old-school sampling tips

01 TIME TO PITCH

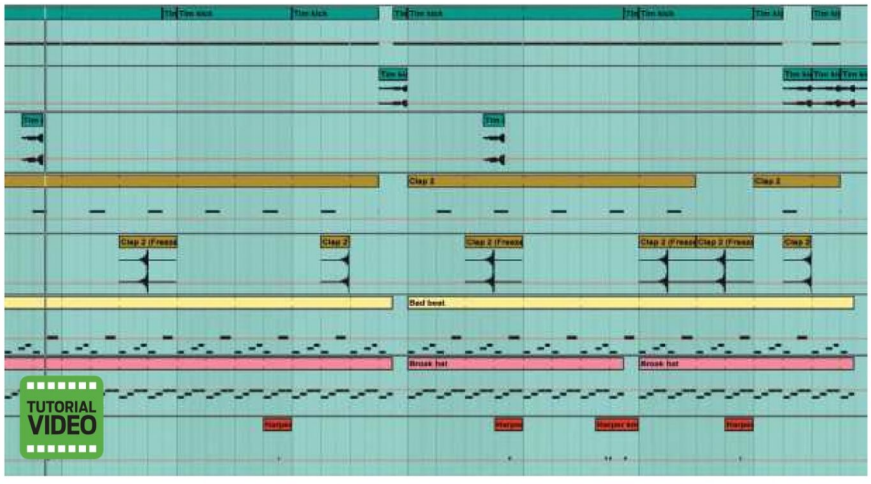
Although basic timestretching was a feature on early samplers, it didn't always give the desired results. To fit a sample's timing to a track, producers would simply play it at a lower or higher note, to speed it up or slow it down. Of course, this would affect the pitch of the sample, too – hence all the high-pitched chipmunk vocals in early hardcore and jungle music. Often, though, it can sound even better and punchier than the best modern warping, particularly on drum loops, as it preserves transients perfectly. Try getting your drum loops in time by tuning them up or down (using a re-pitch mode) first, then render them at that speed before editing them further.

02 GATED TRIGGER

New genres go hand in hand with new technology, and the early-to-mid-90s brought us both jungle (the forerunner to DnB) and affordable timestretching. Not only was it suddenly possible to take a vocal and add it to a track at a very different tempo without making it sound like a chipmunk on helium (or the devil talking slowly), but producers also realised that by halving the tempo, then halving it again (and so on!), they could create slowed-down versions of words and phrases. The process duplicates slices of the sample, creating a gated, stuttering sound – an almost sonic-strobe-like effect – and it still sounds great today!

03 FLIP REVERSE IT

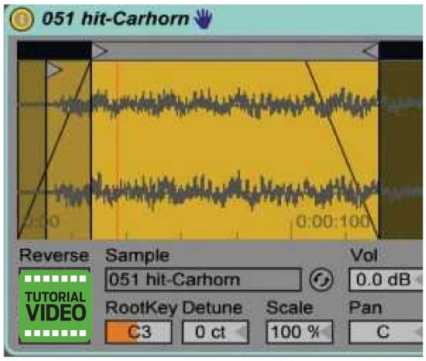
For almost as long as people have been sampling sounds, they've been reversing them. Reserve sounds can be great for edits, and can even form an integral part of your rhythm. Reversed percussion hits like drums and claps can feed into the unreversed hit, or even just sit within the rhythm to give a pump to the groove. It's generally best to place them so that the end of the reversed sound lines up with a beat, even if there's no other hit falling at the same time. If a reversed sound doesn't end on a beat, try adding another bit of percussion at that point to maintain the groove.



We can all reverse a sample, but here we'll show you how to fit it into an existing groove or track

04 SP BASS

Vintage samplers were nothing if not quirky, so it's worth reading up on the unique idiosyncrasies of the kit behind your favourite classic tracks. For example, early-90s New York hip-hop was awash with grimy, low-passed basslines, in part thanks to an oddity of the SP-1200, as Public Enemy producer Hank Shocklee explained to *The Village Voice* (Read the full article at **bit.ly/HankVVoice**). "One day I was playing *Black Steel in the Hour of Chaos*, and it came out real muffled. I couldn't hear any of the high-end part of it. I found out that if you put the phono or quarter-inch jack halfway in, it filters the high frequency. Now I just got the bass part of the sample. I was like, 'Oh, shit, this is the craziest thing on the planet!'" To recreate this, simply add a low-pass filter before your bitcrusher!



In this video, we'll show you how to artificially impose the limits of early sampling technology upon yourself

05 CREATIVE LIMITS

Early digital consumer technologies had memory limitations that we'd consider laughable now. Back then, sampling time came at a premium that we're not used to today, but this led to some pretty inventive behaviour, which in turn resulted in some unique sounds.

Memory could be saved in many places. In order to achieve sustain, for example, it was necessary to use just a short looped section of the sample. When you pressed a key, the attack phase would be played until it reached this looped section, which then continued to play until the key was released, at which point the sample would play from the looped section to the end.

This looping effect was often imperfect and – more importantly – noticeable, and became a key part of the character behind many early sample-based riffs, such as the ubiquitous car horn noise popularised by Todd Terry. This memory limitation, in conjunction with low-resolution editing, meant that the sound of the short loop could be hard to conceal, but one way to deal with this is to throw caution to the wind and use the effect as an overt characteristic that adds to the vibe of the track.

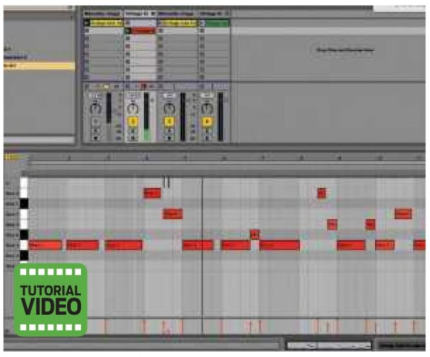
06 SINE OF THE TIMES

Akai's early S900 and S950 samplers were famously prodigious synth bass monsters. Switching on either machine yielded a default sample of a simple sine wave bass, synonymous with early hip-hop, hardcore, jungle and DnB. Sine wave bass is notoriously hard to make interesting, but a combination of 12-bit circuitry and less-than-transparent analogue outputs added real oomph. Recreate this by running a sine wave riff through a bitcrusher and some analogue saturation plugins. The difference may seem subtle until you throw it into a track with other elements.

We use the UAD Ampex ATR-102 to add grit to a simple sine-wave bassline

07 COMBINED METHODS

Some early sample-based machines – such as Roland's D-50 – combined synthesis and sampling. This was partly for creative reasons, but also partly to overcome the limited sampling time available. This technique can produce layered sounds such as percussive strikes and attack phases (that need not change pitch when they're played up and down the keyboard) over sustained sounds that can be played musically. Try your own combinations by mapping two different sounds to the same key-range in your sampler and adjusting their respective envelopes. For example, the attack portion of a piano with the sustain of a trumpet sample. Or a kick sample and an electronic organ, Daniel Beddingfield-style.



Want to know exactly how to slice and play back drum loops the old-fashioned way? We've got you covered

08 CUT THE CHORD

A classic sample-riff effect is to sample a chord and play a riff as if using a regular synth patch. Two things happen in this case: the length of the sample changes (higher notes are shorter, while lower notes get longer), which can have a dynamic effect on the groove; and the actual sound can be rather unusual, as real players don't usually play riffs by transposing all the notes of a given chord up and down in identical semitone intervals. Recreate the effect by recording a chord playing your favourite synth patch, load that recording into a sampler and get busy creating a short riff.

09 VOCAL TRICKS

The mid 80s saw a new kind of vocal taking the charts by storm: the sampled vocal riff. Whether your first introduction was Whistle's *Just Buggin'*, (**bit.ly/JustBuggin**) or Stock Aitken and Waterman's production of Mel & Kim's *Respectable* (**bit.ly/MKrespectable**), nobody could avoid that distinctive sound. By the mid 90s, it was all but dead and buried – a cheesy anachronism born of naïvety and new technology... until a couple of years ago when Major Lazer made a career out of it, starting with *Pon De Floor* (**bit.ly/MLPonDeFloor**) – subsequently sampled for Beyonce's *Run the World (Girls)* – and continuing right up to the recent hit collaboration with DJ Snake and MØ, *Lean On*. The modern Major's general approach employs heavy pitch modulation, but it's essentially the same simple trick: take a word or syllable from a vocal, map it across the keyboard and play a riff or accompaniment.

10 SLICE IT AND DICE IT

A defining innovation of early jungle sampling was the slicing and re-ordering of drum loops, achieved by slicing a beat into chunks and triggering each one in succession via MIDI. Tracks like DJ Seduction's *Sub Dub* (**bit.ly/SeductionSubDub**) created a blueprint for the DnB that was to come by varying the playback pattern in each bar constantly over 8, 16 and even 24 bars.

This was achieved in different ways, the first of which was by carefully chopping a one-, two- or four-bar break into parts with different start points for re-triggering from (choice snares, kicks, 'shuffles', fills, etc). Alternatively, it can be done by copying the same break to between five and ten adjacent keys, and setting a different sample start point for each key (again, choosing percussive hits like kicks and snares). Another way to do the same is to simply slice the loop into quantised measures (eighth-notes, quarter-notes, half-notes, whole notes, etc), complete with off-grid glitchy attack phases and some sliced 'air' to open the loop up again. **cm**